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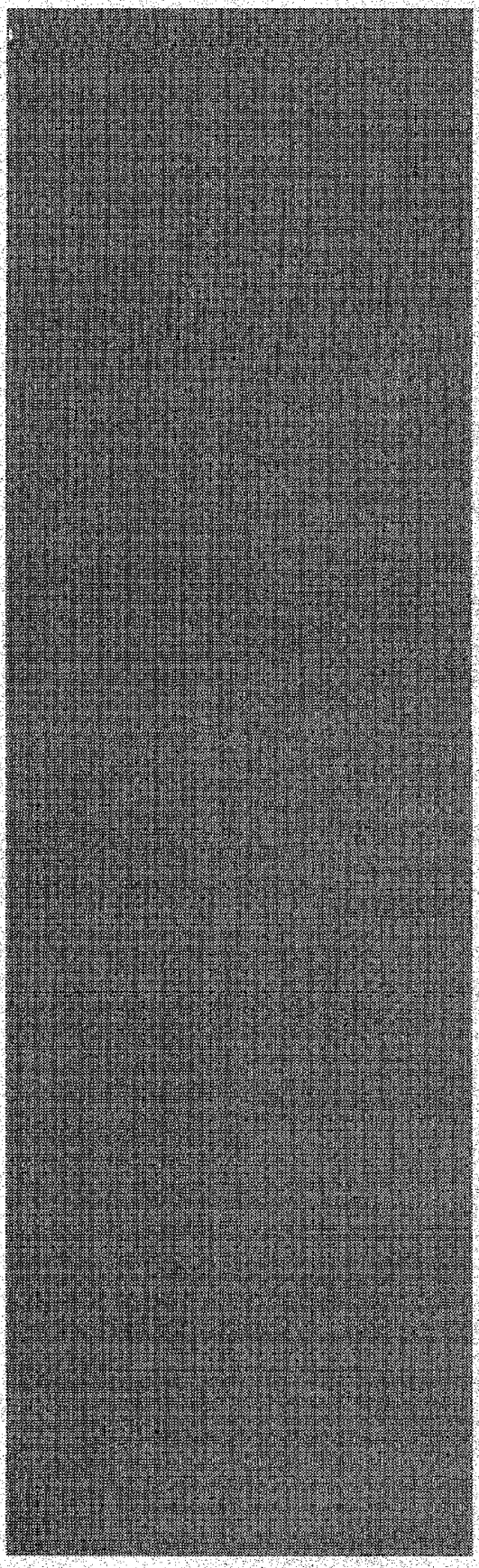

Los Alamos National Laboratory Yucca Mountain Project Publications (1979-1996)

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Los Alamos National Laboratory Yucca Mountain Project Publications (1979-1996)

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LOS ALAMOS NATIONAL LABORATORY YUCCA MOUNTAIN PROJECT PUBLICATIONS (1979-1996)

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Abstract

This over-350 title publication list reflects the accomplishments of Los Alamos Yucca Mountain Site Characterization Project researchers, who, since 1979, have been conducting multidisciplinary research to help determine if Yucca Mountain, Nevada, is a suitable site for a high-level waste repository. The titles can be accessed in two ways: by year, beginning with 1996 and working back to 1979, and by subject area: mineralogy/petrology/geology, volcanism, radionuclide solubility/ground-water chemistry; radionuclide sorption and transport; modeling/validation/field studies; summary/status reports, and quality assurance.

Introduction

Between 1955 and 1979, scientists studied several options for handling this country's high-level nuclear waste. Proposals to dispose of the waste ranged from burial in the ocean floor to rocketing it into outer space. After extensive evaluation, it was determined that underground disposal would have the least environmental impact, and in 1979 preliminary investigations began at Yucca Mountain, Nevada, as well as several other potential sites. The Nuclear Waste Policy Act (NWPA) of 1982 formalized the process to select a high-level nuclear waste repository site, established the responsibilities for characterization, operation, and oversight, and established the Nuclear Waste Fund. The NWPA amendment of 1987 identified Yucca Mountain as the only site to be considered for characterization.

For over 17 years, Los Alamos researchers have been conducting multidisciplinary research to help characterize Yucca Mountain to determine its suitability as a site for a high-level waste repository. They have been defining the nature and distribution of minerals and other geological features of the Yucca Mountain site and determining the extent to which the natural barriers would prevent and/or retard the release and migration of radionuclides from the potential repository. They have been developing models to understand ground-water chemistry flow paths to the accessible environment and determining mineralogy and petrology along these flow paths. Additionally, they have been determining the complexities of radionuclide solubility limits, radionuclide sorption as a function of mineralogy and ground-water chemistry, radionuclide diffusion in tuff, and radionuclide migration at all scales, as well as studies on microbiological activity as it affects transport. The mineral alteration history of the mountain is also being studied, and there is an extensive effort to assess the probability of future volcanic activity in the region by determining the characteristics of past eruptions, partly through the application of corroborating Quaternary dating methods. Finally, modeling and field validation studies are being conducted.

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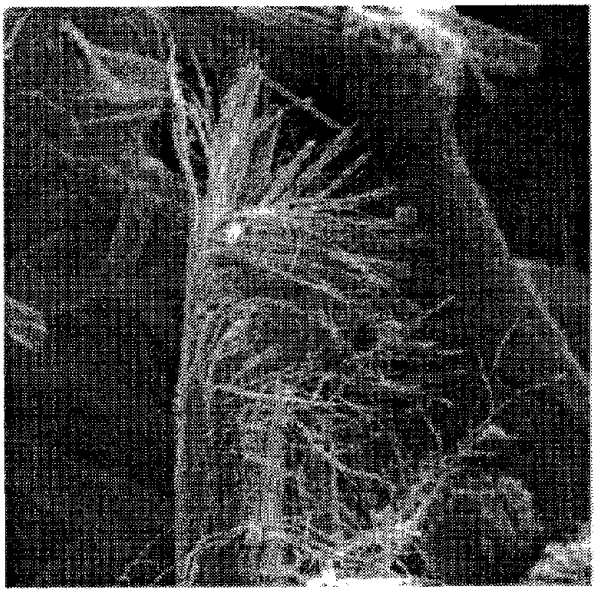

SEM photo of erionite
USW UZ-14, 415.7 m

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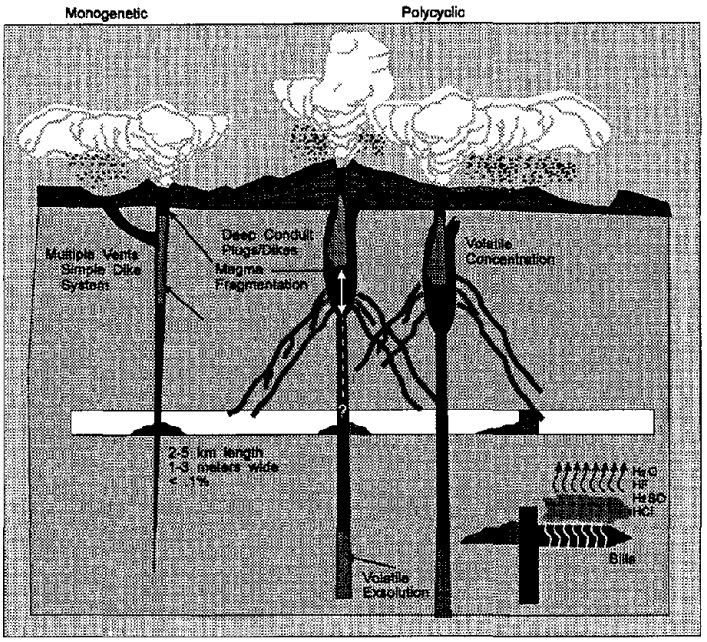

Schematic cross section of a volcanic event penetrating a repository

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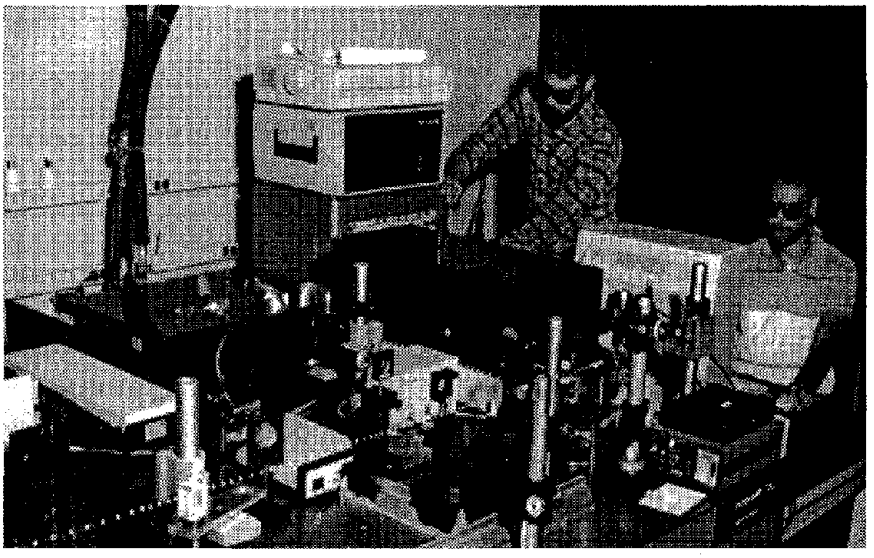

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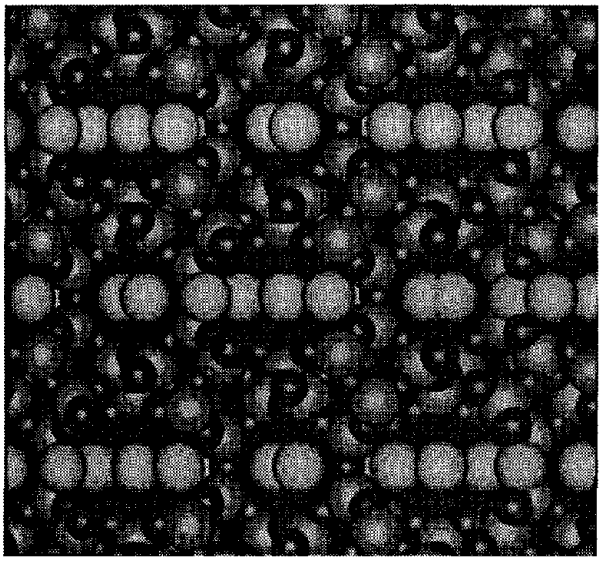

Molecular model of Clinoptilolite

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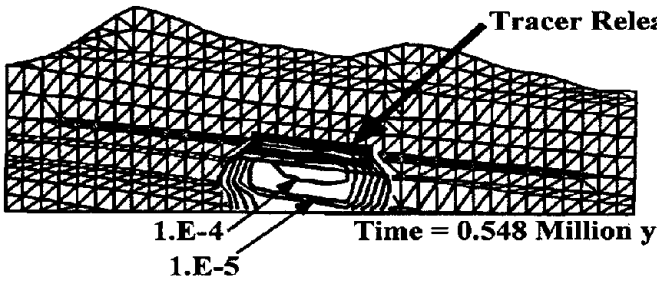

Simulated Np Concentration profile assuming a leak from a section of the Yucca Mountain potential repository over a short time period. Np distribution after 547,945 years is shown by seven isoconcetration lines at concentration = E-4, 1.E-5, !.E-6 ... 1.E-10

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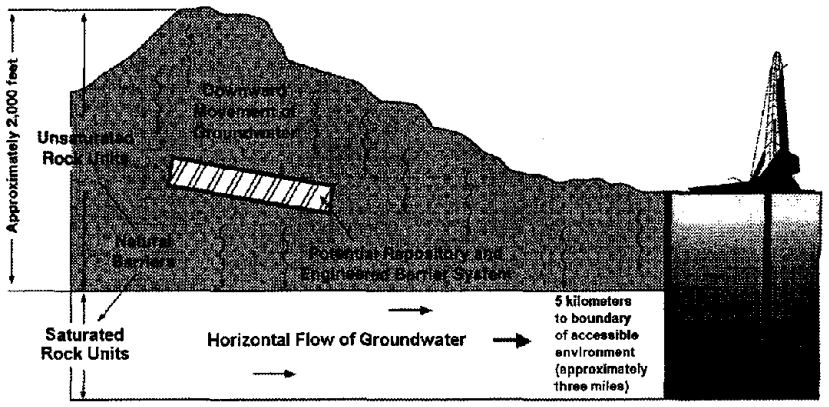
Approximately 2,000 feet
Unsaturated Rock Units
Natural Barriers
Saturated Rock Units
Horizontal Flow of Groundwater
5 kilometers to boundary of accessible environment (approximately three miles)

Schematic of the potential repository site in unsaturated rock at Yucca Mountain

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